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CLINICAL AND SOCIAL PHARMACY**

KNUST

**EVALUATION OF PHARMACEUTICAL CARE IN
TWO GOVERNMENT HOSPITALS IN THE
CENTRAL REGION**

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February 2010

Evaluation of Pharmaceutical Care in Two Government
Hospitals in the Central Region

BY

KNUST
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B. PHARM (HONS.)

A Thesis submitted to the Department of Clinical and Social Pharmacy,
Kwame Nkrumah University of Science and Technology
in partial fulfilment of the requirement for the degree of

MASTER OF SCIENCE

Faculty of Pharmacy and pharmaceutical sciences,

College of Health Science

February 2010

ABSTRACT

The study investigated the existence of pharmaceutical care issues among In-Patients in the Cape Coast District Hospital and the Central Regional Hospital all in the Central Region of Ghana. It also identified the pharmaceutical care plans and actions, and determined the feasibility of implementing them to resolve such issues.

A total of eighty-seven patients were involved in the study.

Patient records and interview were used to collect data for the study.

The results indicated that a total of 673 pharmaceutical care issues (PCIs) were identified among the 87 in- patients in the two hospitals, and that the majority of the PCIs were identified from the prescription, and the rest from medical records and patient interview. Pharmaceutical Care Issues (PCIs) identified include; Potential/Suspected adverse drug reaction , Education and Counseling required, Cost issues , Monitoring Issue Inappropriate dosage regimen, Inappropriate duration of therapy etc.

1485 separate actions were recommended and implemented by the pharmacists to resolve the 673 PCIs identified in the two hospitals. Whereas some PCIs required action which involved only patients, such as the provision of advice, others required communication with a health care professional and even sometimes communication with both.

In conclusion, pharmaceutical care issues really exist among in-Patients and that it is feasible to formulate and implement care plans (as well as providing pharmaceutical care) in general practice settings such as the Cape Coast District Hospital and the Central Regional Hospital in line with recommended guidelines to resolve such issues.

ACKNOWLEDGEMENTS

I first of all want to recognize the powerful hands of the Almighty God in ensuring the success of this work. What do we have that God did not provide? I believe He provided me with the strength, wisdom, knowledge, the financial and material resources and all that was required for this study.

This work was funded by the management of the Cape Coast District Hospital and Nat and Sons Pharmacy Limited all in the Cape Coast Municipality and I want to express my appreciation for this and much other assistance they offered. I am also grateful to the two participating hospitals (general medical practices) and their staff; the pharmacists, doctors and all prescribers, nurses etc. especially the Medical Superintendent and Medical Director of the Cape Coast District Hospital and the Central Regional Hospital respectively for permitting me to use their facilities for this study.

To all the patients who participated in this study I say thank you all and may the good Lord be with you wherever you may be. I also want to show my appreciation to management and staff of my current work place, the Ankaful Leprosy and General Hospital especially staff of the pharmacy department who assisted me in diverse ways especially in the area of delegating some of my duties to them to enable me carry out this study.

I also want to recognize the contributions made by Mrs. Mary Adjei-Ayiah of the Valco Hall, University of Cape Coast towards the success of this piece of work in the area of typesetting.

To the Lecturers and entire staff of the department of Clinical and Social Pharmacy, I believe that without your committed and dedicated guidance and direction, this work could not have

been successful. I sincerely appreciate the guidance, direction and contributions offered by my research Supervisor, Professor Mahama Duwiedua, Dean, Faculty of Pharmacy; Doctor Frances Thelma Owusu-Daaku, Head of department, Department of Clinical and Social Pharmacy; Miss. Afia Frimpomaa Asare, Lecturer and Assistant Supervisor for this research; Mr.Kwame Ohene Buabeng, Lecturer and Mr. Berko Panyin Anto, Lecturer all of Clinical and Social pharmacy department. May the Almighty God replace in abundance whatever you might have lost in offering such assistance.



DEDICATION

I dedicate this piece of work to my entire family including my wife, Joyce Baaba Twentoh (Mrs.) and children; Linda Ekua Twentoh, Sharon Baaba Twentoh, Nana Abekah Twentoh Jnr. and Emmanuella Araba Twentoh as well as Emmanuel Prims for their tremendous support, morally, physically and spiritually.

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LIST OF ACRONYMS

ACE Angiotensin-Converting Enzyme

ATS	Anti-Tetanus Serum
BTL	Bilateral Tubal Ligation
CRAG	Clinical Resource and Audit Group
CV	Cardio-Vascular
CVA	Cardio-Vascular Accident
CHD	Coronary Heart Disease
C/S	Cesarean Section
DU	Duodenal Ulcer
F	Female
GP	General Practitioner
GI	Gastro-Intestinal
GTN	Gliceryl-trinitrate
HPT	Hypertension
LFT	Liver Function Test
M	Male
NSAID	Non-Steroidal Anti-Inflammatory Drug
NGT	Naso Gastric Tube
OTC	Over the Counter
OP	Operation
ORS	Oral Rehydration Salt
PVD	Pulmonary-Vascular Disease
PV	Per Vagina
PIH	Pregnancy-Induced Hypertension

PID	Pelvic Inflammatory Disease
RTI	Respiratory Tract Infection
RIH	Right Inguinal Hernia
CCDH	Cape Coast District Hospital
CRH	Central Regional Hospital
RDU	Rational Drug Use
GNDP	Ghana National Drug Programme



CHAPTER ONE

INTRODUCTION

1.1 Background

Pharmaceutical care has been described as “the responsible provision of drug therapy to achieve definite outcomes that are intended to improve a patient’s quality of life” (Hepler & Strand 1990). Though pharmaceutical care seems to focus on the pharmacist, the principles to assess patients’ response to drug therapy are of value to all who have responsibility for the health and well being of the patients they serve including all other health professionals such as physicians, nurses, and physician assistants (medical assistants).

A pharmaceutical care issue is an element of a pharmaceutical need (a patient’s requirement for a pharmaceutical product or service) which is addressed by the pharmacist.

The following concepts need to be considered seriously in pharmaceutical care. These are that:

- i. The practitioner must have a belief and commitment that he or she shares equal responsibility with the patient and Prescriber for optimal drug therapy outcomes and is willing to make this belief the driving force of practice.
- ii. The practitioner must be able to establish a trusting professional-patient relationship. This will for example enable him or her to gather the necessary medical and social history needed to identify therapeutic problems, assess the patients’ knowledge about drug therapy as well as establish and evaluate therapeutic outcomes. This information is essential to the design and implementation of a pharmaceutical care plan that is specific to an individual

patient's needs. It is well noted that the provision of such individualized care also encourages patients to use the pharmacist as a resource for drug therapy dilemma.

- iii. There is the need for formal documentation, not only of pharmaceutical care plan but also of all clinical interventions and therapeutic outcomes. These records enhance the continuity of care and can be used to communicate with other providers involved in the patient's care.

There have been an increasing number of reports of pharmacists working closely with general practitioners (GPs) to improve prescribing and to provide direct services to patients (Goldstein et al, 1998 and Martin et al, 1998).

Scottish General Practitioners considered pharmacist's review of individual patients' medication as being desirable and there is evidence that this particular activity is developing rapidly the world over (Mackie et al, 1999 and Bell et al, 1999).

Review of medication is an integral part of the process of pharmaceutical care, requiring a systematic approach, involving documentation.

The Scottish Office Department of Health Clinical Resource and Audit Group (CRAG) issued guidelines which provide, among other things, a clear, systematic approach to the pharmaceutical care of individual patients in primary care (CRAG, 1999).

The three stages of the process involved in delivering pharmaceutical care to individual patients described in the guidelines are:

- Assessing patients for pharmaceutical care issues

- Formulating a pharmaceutical care plan
- Implementing and monitoring the pharmaceutical care plan

It describes a study undertaken in Grampian in which clinically trained pharmacists provided pharmaceutical care. The work focused on the elderly taking multiple medicines, since it has already been shown that patients in these categories are most likely to have pharmaceutical care issues, such as potential or actual medication related problems.

1.2 Definition of Terms

This section provides meaning of terms as used in this study.

- Pharmaceutical need;** a patient's requirement for a pharmaceutical product or service.
- Pharmaceutical care issue;** an element of a pharmaceutical need which is addressed by the pharmacist.
- Desired output;** a statement of what the pharmacist aims to achieve for a patient in relation to a pharmaceutical care issue.
- Actual output;** the response of the health care team and/or the patient to the pharmacist's actions and/or the clinical outcome for the patient.
- Pharmaceutical action;** an action by a pharmacist to address a pharmaceutical care issue for a patient.
- Pharmaceutical care plan;** One or more pharmaceutical care issues for an individual patient, together with the desired output (s) and the action(s) planned to achieve the output(s).

- g. **Patient medication profile;** a document which is maintained by the pharmacist to support the pharmaceutical care of a patient.
- h. **Stakeholders:** Those responsible for managing the health sector including the Government, Ministry of Health (MOH) and Ghana Health Service (GHS).
- i. **Prescriber:** One who diagnose and writes drugs for patients. This may be a specialist or a general practitioner.
- j. **Carer:** A patient's relation responsible for the welfare of that patient while in the hospital
- k. **Pharmaceutical Risk Factor:** This factor may mean that patients are more likely to suffer from drug toxicity, lack of effectiveness or not to take their medication optimally

1.3 Definition of pharmaceutical care

Pharmaceutical care is defined as the responsible provision of drug therapy for the purpose of achieving definite outcomes that improve a patient's quality of life. These outcomes are to:

- a. Cure a disease
- b. Eliminate or reduce a patient's symptomatology
- c. Arrest or slow down a disease process or
- d. Prevent a disease or symptomatology.

It involves the process through which a pharmacist cooperates with a patient and other health professionals to design, implement, and monitor a therapeutic plan that will produce specific therapeutic outcomes for the patient. This in turn involves three major functions namely;

- i. Identifying potential and actual drug-related problems (or pharmaceutical care issues),
- ii. Resolving actual drug-related problems and
- iii. Preventing potential drug-related problems.

Pharmaceutical care is a necessary element of health care, and should be integrated with other elements. It is however, provided for the direct benefit of the patient, and the pharmacist is responsible directly to the patient for the quality of that care. The fundamental relationship in pharmaceutical care is a mutually beneficial exchange in which the patient grants authority to the provider and the provider gives competence and commitment (accepts responsibility) to the patient.

Finally, it is worth noting that the fundamental goals, processes, and relationships of pharmaceutical care exist regardless of the type of practice setting.

1.4 Pharmaceutical care in Ghana

In Ghana, pharmaceutical care was introduced in the 1980s and since then the stakeholders in health including the academia like the School of pharmacy have been doing their best by way of training pharmacists in clinical pharmacy with the aim of improving clinical and pharmaceutical services in particular and health delivery system in general.

There is however not known documented information on pharmaceutical care and its associated care issues on hospitals in the Central Region of Ghana to the best of my knowledge, making a case for the justification of this study.

1.5 Models of pharmaceutical care

- Minnesota
- Iowa
- Therapeutic Outcome Monitoring and
- Scottish Models

1.5.1 Minnesota Model

This form of pharmaceutical care practice is based on the work done by Linda Strand and co-workers in the University of Minnesota, where it was developed. The process is divided into three components:

1. **Assessment;** The practitioner completes an assessment of the patient's drug-related needs, including the identification of any drug therapy problems (or pharmaceutical care issues) that exist, or need to be prevented in the future. The purpose of the assessment is:

- To determine that all of a patient's drug therapy is the most appropriate, most effective, safest and most convenient available;
- Identify any drug therapy problems that might be interfering with the goals of therapy;
- Identify any drug therapy problems that the patient is at risk of developing in the future.

2. **Care Plan:** The care plan has three purposes:

- To resolve any drug therapy problems identified during the assessment;
- To meet the goals of therapy for each of the patient's medical conditions, thereby achieving the outcomes desired by the patient;
- To prevent future drug therapy problems from developing.

Goals need to be established for each of these purposes and they need to be clearly stated, measurable and achievable by the patient. Based on the patient's identified needs, the care plan will include interventions that are designed to resolve problems, achieve therapeutic goals and prevent new problems from developing. Interventions might include providing information about non-drug therapies, where appropriate.

3. **Evaluation:** The final step in the patient care process is the evaluation. This is an encounter with the patient either in person or on the telephone, which allows the practitioner to collect necessary information to determine whether the decisions made and actions taken during the assessment and care planning produce positive results. Times for this must be scheduled with the patient. The purpose of the evaluation is:
 - To determine progress toward meeting the established goals of therapy for each of the patient's medical conditions by evaluating the actual outcomes a patient experiences against these stated goals;
 - To assess whether any new drug therapy problems have developed or whether any new drug therapy problems need to be prevented in the future.

1.5.2 Iowa Model

The setting up of the Iowa Centre for Pharmaceutical Care led to the publication of *A Practical Guide to Pharmaceutical Care*. This guide identifies five steps in the pharmaceutical care process:

- A professional relationship must be established with the patient
- Patient-specific medical information must be collected, organized, recorded and maintained
- Patient-specific medical information must be evaluated and a drug therapy plan developed mutually with the patient
- The pharmacist must ensure that the patient has all supplies, information and knowledge necessary to carry out the drug therapy plan
- The pharmacist must review, monitor and modify the therapeutic plan as necessary and appropriate in concert with the patient and health care team.

It says that pharmacists who provide pharmaceutical care must ensure that the following needs are met:

- Patients have an appropriate indication for every drug they are taking
- Patients' drug therapy is effective
- Patients' drug therapy is safe
- Patients can comply with drug therapy and other aspects of their care plans
- Patients have all drug therapies necessary to resolve any untreated indications

In essence, what the Iowa Centre has produced is a means of teaching and practicing pharmaceutical care. It makes no inventors' claims. Its input is best described as finding a means of putting the pharmaceutical care model into effect.

1.5.3 Therapeutic Outcome Monitoring

Therapeutic Outcome Monitoring (TOM) is a pharmaceutical care concept that is based on monitoring outcomes of pharmacotherapy and adapting therapy according to those outcomes. This is performed by following a set of procedural steps that can be carried out in community practice. The TOM process was designed by researchers at the Florida College of Pharmacy in co-operation with practicing pharmacists. Development work began in 1991. As originally designed and tested TOM was disease specific. Initial work was done on a model for asthma.

Steps in the patient care model [as set out in the referenced paper] are as follows.

1. Record and interpret patient information. ("What do we need to know about this patient?")
2. Document desired therapeutic objectives for the patient and document the therapeutic plan. ("What do we intend to achieve with this therapy in this patient?")

The pharmacist considers two basic types of therapeutic objectives; clinical objectives (from a professional viewpoint) and quality-of-life objectives (from the patient's viewpoint). If possible, the pharmacist learns the patient's objective from the patient or care-giver and clinical objectives/therapeutic plan from the physician or other health care providers.

3. Evaluate the therapeutic objectives and the therapeutic plan. ("Are these appropriate therapeutic objectives, and is this an acceptable plan for achieving those objectives for this patient?")

The pharmacist evaluates potential drug related problems (any obstacle to achieving therapeutic objectives). Keeping in mind the patient's medical problems, lifestyle, and preferences, the pharmacist:

- Decides whether the patient has or is likely to develop problems with therapy
 - Decides whether modifying the regimen is necessary, and if so, consults the prescriber
 - Documents the evaluation, potential problems, and any prescriber consultation
4. Design a monitoring plan. ("What should we look for to assess therapeutic success or failure?")

On the basis of potential problems identified in Step 3, the pharmacist:

- Devises a procedure to obtain the data needed to monitor the patient's progress toward therapeutic objectives
 - Establishes when and how the monitoring data will be collected and documents the plan in the patient record (a daily calendar diary or other reminder log may be necessary)
5. Dispense drug products, advice patient. ("Can the patient now optimally use this medicine?")

The pharmacist includes specific information about how the patient or care-giver can monitor the progress of therapy, how to detect pharmacotherapeutic problems, and what actions to take if a possible problem is detected. The pharmacist provides supplementary written material as appropriate. Before the interview ends, the pharmacist decides whether the patient (or care-giver) understands the therapeutic objective and what to do to reach it.

6. Implement the monitoring plan (collect monitoring data).

The pharmacist carries out the monitoring plan as decided in Step 4. (This step will usually occur some days or weeks after Step 5, and may require an appointment for a visit or a telephone call.)

Evaluate patient progress and identify pharmacotherapeutic problems. ("Is this patient progressing toward therapeutic objectives?")

On the basis of monitoring data, therapeutic objectives, and patient data, the pharmacist systematically evaluates the patient's progress. He or she evaluates and documents the following:

- **Availability.** Is there evidence that the patient is receiving the therapy as intended?
- **Effectiveness.** Is there evidence that the patient is obtaining the intended benefit from therapy?
- **Adverse effects.** Does the patient show any signs or symptoms consistent with a new medical problem that could result from an adverse drug event, toxicity, or side effect?

b. Respond to problems. ("What action should I take now?")

The pharmacist considers pharmacotherapeutic problems and follows through. He or she exercises judgment in the patient's interest. Most responses take one of two courses:

- **Resolution:** Resolving the problem entails five steps: defining the problem; identifying the cause (review information from Step 3 for possible causes); choosing alternative solutions; selecting the best alternative; and implementing the solution. Then monitoring resumes.
 - **Referral:** The pharmacist refers to others (e.g., physicians) problems that he or she cannot resolve alone.
- c. Review the record (documentation of earlier steps) and complete documentation of the episode, problems noted and actions taken
 - d. Report to the physician periodically as necessary.
 - e. Revise or update the monitoring plan as necessary.

The process is cyclical and is intended to be repeated as necessary.

1.5.4 Scottish Model

This model is believed to have been produced out of a Clinical Resource and Audit Group.

(CRAG) report. It believes that;

A pharmaceutical care process is to be found described (but not named as such) within a report on "Clinical pharmacy practice in primary care" produced by the Clinical Resource and Audit Group (CRAG) in 1999. CRAG is a body which advises the government on clinical effectiveness issues. It is chaired by the chief medical officer for Scotland. The report referred to here was drawn up by a consensus group set up by CRAG. Its chairman was Professor John Cromarty of the School of Pharmacy, Robert Gordon University, and Aberdeen. The report was assessed before publication by members of the medical and nursing professions.

The report says that it is important to apply a systematic approach to the care of all patients, to identify those whose pharmaceutical needs have not been met and who, as a consequence, may be placed at risk from a lack of disease prevention measures or from sub-optimal therapeutic management. It describes a process requiring:

- Assessment of patients to identify pharmaceutical care issues (i.e., those elements of pharmaceutical need that can be addressed by the pharmacist)
- Pharmaceutical care plans to be formulated, documented, implemented, monitored and reviewed for those patients with pharmaceutical care issues.

Assessing patients for pharmaceutical care issues requires identifying or confirming pharmaceutical care needs. These range from the simple requirement for a medicine to the more complex requirement of a dosage adjustment. When assessing the patient, full account must be taken of all patient and medication factors that may predispose the patient to the risk of treatment failure or adverse effects. The assessment process involves talking to the patient, carer or representative and consulting other

members of the health care team and patient medication and/or clinical records. Patient risk factors may be associated with:

- Patient characteristics such as age, gender and weight
- Relevant past medical history and current active medical problems
- Functional and cognitive factors such as mobility, dexterity and comprehension
- Social and environmental factors, such as home environment, social drug use and family support
- Patient's health beliefs including perception of drug therapy and expectation of care

Medication risk factors may be associated with:

- Response to current and previous drug therapy
- Drug disposition factors such as reduced renal or hepatic clearance
- Toxicity factors such as allergy, contra-indications and interactions
- Drug administration factors such as complexity of regimen and delivery devices
- Use of purchased medicines and/or complementary therapies
- Repeat of medicines in the absence of appropriate monitoring and review

A key component of the assessment process involves talking with the patient (or carer) about their drug therapy. Where necessary, the pharmacist may need to conduct a structured interview to obtain a detailed medical history. Knowledge of therapeutics, product awareness and communication skills are used to collect details of past and present use of all medicines from the patient. The following aspects of medicines use should be determined:

- The patient's perceived needs
- Perceived indications
- Frequency of use
- Outcomes such as partial or full response
- Adverse outcomes such as failure to respond, side effects and adverse drug reaction

Interviews can also reveal previous medicines use, the patient's perceptions of disease and therapy, prior existence of efficacy and toxicity, including allergies and hypersensitivities, and levels of adherence to prescribed regimens.

In considering the most appropriate pharmaceutical actions to achieve a desired output, account should be taken of:

- The particular needs of the individual patient (for example, drug choice/dosage regimen in relation to concurrent disease states/drug therapy)
- Any previous adverse drug reactions/hypersensitivities which may present if the causative agent (or drug within the same class) is considered for use
- The acceptability of the action to the patient (for example, patient's health beliefs including their perception of drug therapy and expectation of care)
- Medicines resource management issues (for example, practice formularies and protocols)

The pharmacist's record of pharmaceutical care issues and desired outputs, together with the pharmaceutical actions, form a documented pharmaceutical care plan.

Implementing a care plan may require a pharmacist to:

- Discuss pharmaceutical care issues with the patient's General Practitioner (Doctors) or prescriber
- Counsel the patient and/or their caregiver (s)
- Arrange for the patients to consult their Prescribers or Doctors, practice nurse/district nurse (for example to take blood samples for analysis) or other health care professionals
- Monitor indicators of disease progress and effects of drug therapy
- Arrange for amendments to computer records
- Arrange for a prescription to be provided
- Liaise with other pharmacists to ensure continuity of pharmaceutical care

The pharmacist should agree a monitoring strategy with other members of the primary health care team and the patient. The strategy should measure progress towards achievement of the desired outputs. Monitoring procedures should be undertaken at specified intervals and for a defined duration, prior to further review.

Actual outputs are evaluated in relation to the desired outputs to determine whether pharmaceutical care issues have been resolved. The care plan may change as patients develop different pharmaceutical needs. Pharmaceutical care plans should follow the patient if they transfer from one health care setting to another.

1.6 Problem Statement

In our part of the world (in Ghana specifically), even though Pharmaceutical Care is being provided in all healthcare facilities, identification and resolution of pharmaceutical care issues have not been given the necessary priority. This research

therefore seeks to determine the need for pharmaceutical care and the feasibility of formulating and implementing pharmaceutical care plan or actions with a view of developing sustainable policies and programmes aimed at promoting efficient pharmaceutical care in the central region of Ghana.

Pharmaceutical care provision is the responsibility of the pharmacist. Nevertheless, all health care professionals have the total welfare of the patient at heart and are concerned about the patient's health progress. The pharmacist alone is therefore not in the position to provide pharmaceutical care without the support of the other health care staff especially in the areas of resolving pharmaceutical care issues.

Notwithstanding all the efforts by the Ministry of Health (MoH) and Ghana Health Service (GHS) to train pharmacist in clinical pharmacy, the impact of pharmaceutical care is still low. The need for pharmacists with skills in pharmaceutical care provision in Ghana is not even established.

1.7 Rational for the Study

The rational for the study is to enable us have documented evidence of the existence of Pharmaceutical Care Issues among in-patients and to be able to establish the possibility of formulating Pharmaceutical Care Plans as well as determining the feasibility of implementing such plans or actions to resolve the issues through pharmaceutical care processes in the Central Region.

1.8 Aim of the Study

The over-all purpose of this study was to evaluate pharmaceutical care issues by way of identifying pharmaceutical care issues existing among in-patients, identifying

pharmaceutical care plans and determining the feasibility of implementing them to resolve such issues identified at the Cape Coast District Hospital and the Central Regional Hospital.

1.9 Objectives

1. To determine or identify pharmaceutical care issues existing among in-patients receiving treatment in the hospitals;
2. To determine the most common pharmaceutical care issues
3. To determine the disease states most requiring pharmaceutical care interventions
4. To formulate pharmaceutical care plans and actions for resolving the identified pharmaceutical care issues
5. To determine the feasibility of providing pharmaceutical care and implementing pharmaceutical care plans to resolve identified pharmaceutical care issues in general practice settings
6. To find out the relationship between certain variables (such as number of drug usage) and pharmaceutical care issues.

CHAPTER TWO

RESEARCH METHODOLOGY

2.1 Study Area

The Cape Coast District and Central Regional Hospitals serve a large population of people in Ghana in general and Central Region in particular especially the Cape Coast Municipality. The two hospitals are also situated strategically on the Trans West African Highway through Ghana, linking Togo to La-Cote Devoir and therefore may be serving people in the sub-Region as well. In addition, the Central Regional Hospital serves as a referral hospital for all the numerous district hospitals and other health care facilities in the region.

2.1.1 Research Design

The study utilized the CRAGS' model of pharmaceutical care in its design. This was chosen because the model considers the following which are relevant in this research:

- Assessment of patients to identify pharmaceutical care issues (i.e., those elements of pharmaceutical need that can be addressed by the pharmacist)
- Pharmaceutical care plans to be formulated, documented, implemented, monitored and reviewed for those patients with pharmaceutical care issues (CRAG, 1999).

2.1.2 Target Population

The target population for the study was In-Patients receiving medical care in the hospital.

2.1.3 Sampling and Sample Size

All in-patients receiving multiple drug therapy were selected for the study over a period of three weeks. With exception of the Isolated ward and Delivery suit of the Cape Coast District Hospital and the Central Regional Hospital respectively, all other wards in the two hospitals were selected for the study. In all a total of eighty-seven in-patients were selected from the two hospitals to be involved in this study. For the Cape Coast District Hospital, twenty-seven (27) in-patients were involved, whereas sixty (60) in-patients from the Central Regional Hospital were involved in the study.

2.2 Sources of Data and Methods of collection

The data was collected from the treatment sheets and other important documents like medication tallying and billing sheets in the folders of the patients.

Some of the data were also collected by way of interviewing patients and carers or relatives especially relatives of children, unconscious or patients who could not speak. Specific example of such an information obtained from serious patient interview or investigation was non-prescription drugs used by patients. Some nurses, pharmacy staff and medical officers or prescribers were also interviewed for certain clarification to make the data collections more relevant especially where hand writings were not very clear and to ascertain the truth on the availability or otherwise of certain prescribed drugs. Information or data collected included; serial numbers of each patient. For example the first patient from which data was collected had one (1) as his or her serial number. The second patient had number two (2) as his or her serial number and so on.

The other information collected were: Patients identity or folder number, age, sex, diagnosis, the ward of the patient, pharmacotherapeutic data or information such as type

of drug prescribed including whether it was written in generics or otherwise, the strength, formulation, dosage and frequency as well as the duration for which the drug was prescribed and the availability of the prescribed drug at the health facility.

Whereas the Cape Coast District Hospital had four wards from which data was collected namely: maternity, male , female and children's ward, the Central Regional Hospital had seven wards from which data was collected namely: Male Surgical, Female Surgical, Male Medical, Female Medical, Paediatric, Obstetrics & Gynaecology, and Intensive Care Unit(ICU) .

2.3 Tool Development

2.3.1 The variables of the study

Dependent variables are:

- a. Pharmaceutical care issues among In-Patients.
- b. Pharmaceutical care plans.

Independent variables are:

- a. Selected socio-demographic characteristics of In-Patients
 - i. Folder or I.D number
 - ii. Age
 - iii. Sex
 - iv. Name of ward into which patient was admitted
- b. Pharmacotherapeutics
 - i. Name of drug
 - ii. Strength of drug

- iii. Formulation of drug
- iv. Dose and frequency of drug administration
- v. Duration of drug therapy
- c. Average number of drugs per prescription
- d. Percentage of cases with written diagnosis
- e. Percentage of drug availability in health facility
- f. Percentage of drugs prescribed in generics
- g. Diseases and causes of admission
- h. Pharmaceutical risk factors
- i. Pharmaceutical care services provided by pharmacist to resolve pharmaceutical care issues:
 - i. Advice to patients and carers
 - ii. Advice to health care professionals

2.4 Ethical Permission

A letter was first written to the medical superintendent and medical director of the Cape Coast District Hospital and the Central Regional Hospital respectively seeking their permission to carry out the research in those health facilities, explaining the significance and purpose for the research and stressing the fact that it is not a fault finding exercise and also assuring them of confidentiality.

Copies of these letters were also delivered to each ward in-charges for prior information to every staff in the ward especially the nurses, but not to any of the prescribers so as not to influence a change in their way of prescribing.

It must be noted however that results from data collection were discussed with prescribers.

2.5 Data Collection

On the day of collection, permission was sought from the ward in-charges to get access to the patients and their medication records (folders) for the data collection. For conscious patients, the study and its purpose were communicated to them, and they were also assured of confidentiality of any information that might be taken from them.

All required information was then collected from the folders. For example, the availability of prescribed drugs was collected from the billing sheet. The absence of a prescribed drug on the billing sheet was considered not to have been supplied by the health facility and therefore considered as not available at the health facility for that matter.

Some patients, patients' relatives, nurses and pharmacy staff were interviewed to confirm non-availability of drugs in the facility when necessary.

Data was collected from in- patients on multiple drug therapy in the two health facilities except patients in the cholera and the isolation wards of the CCDH and the delivery suits of the Central Regional Hospital (where, patients were brought in purposely to deliver and are discharged after few hours of observation or transferred to

the Obstetrics and Gynecology ward for admission if further management or treatment was required).

2.5.1 Documentation of collected data

The findings were then entered in a tabular form as raw data in Tables 1 and 2 for the Cape District Hospital and the Central Regional Hospital respectively.

The results of the raw data were then analyzed to provide some important information or issues which need some consideration in Pharmaceutical Care. They were also tabulated as a summary of the two Tables 1&2, and labeled as Tables 3,4,5,6,7,8,9,10 etc with the appropriate headings as they relate to pharmaceutical care issues (as shown in the tables). Statistical Package for the Social Sciences (SPSS) was used in analyzing the data.

2.6 Assessing patients for Pharmaceutical Care Issues

As mentioned earlier, the information or data was obtained from the patient medical records about prescribed medicines, disease states and monitoring parameters. From these, an assessment of pharmaceutical risk factors was made. The patients were then interviewed to obtain further information about their use of medicines, both prescribed and purchased, any problems in obtaining or using these, and their responses to the medicines, both efficacy and toxicity.

A specially developed checklist of common side effects was used to assist in making sure all relevant symptoms were covered. The information was compiled on specially designed forms into a patient medication profile and pharmaceutical care issues

(PCIs) identified as part of the documentation process. The issues identified were then discussed among the pharmacists and the prescribers.

The point at which PCIs were identified was noted as deriving from the prescription, from medical note review or from interview.

2.7 Formulating a pharmaceutical care plan

For each of the Pharmaceutical Care Issues (PCIs) identified, a desired output was documented, along with a proposed action. The list of PCIs, outputs and actions formed a pharmaceutical care plan. This was then discussed with the prescribers who were also asked whether they agreed both with the PCIs documented and with the actions recommended.

2.7.1 Implementation and monitoring of the pharmaceutical care plan or action

The actions needed to address each of the PCIs were classified according to;

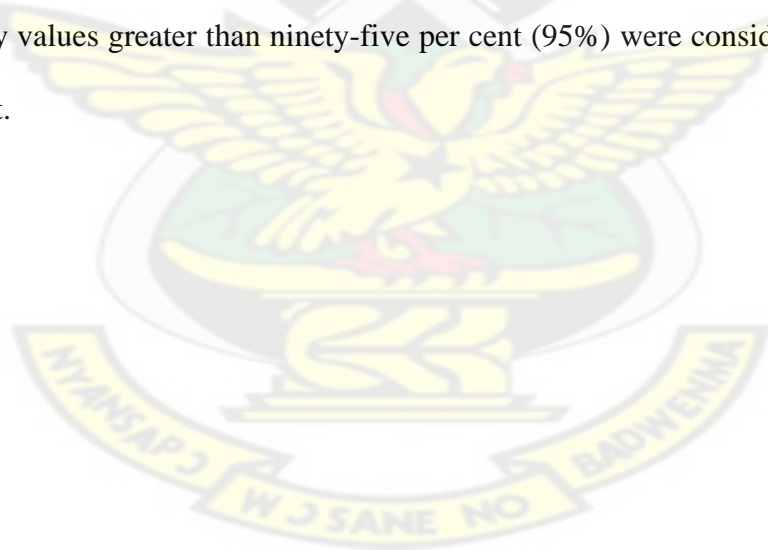
- (i) Who had been involved in the action and
- (ii) The purpose of the action.

The pharmacists then implemented all the actions with which the Prescribers had agreed. In cases where implementation required a further and possible visit to the patient's home, this was undertaken by the pharmacist. However, for the purpose this work, the patients were not followed up to determine whether PCIs were still outstanding,

whether there were any new PCIs and any possible reasons for PCIs not being resolved. This is something worth recommending for in further studies.

2.8 Data analysis

Data were analysed statistically using the Statistical Package for Social Sciences (SPSS) version 6.0 and Microsoft Excel version 6.0. Medicines were recorded with their names as they appear in the patient's medication record for easy identification of a drug not written in generic. Age, number of medicines used, number of disease states present and number of pharmaceutical risk factors were categorised to enable investigation of relationships between these factors and the presence of different types of PCI and any probability values greater than ninety-five per cent (95%) were considered as statistically significant.



CHAPTER THREE

RESULTS

3.1 DEMOGRAPHIC CHARACTERISTICS OF IN-PATIENTS RECEIVING PHARMACEUTICAL CARE AT THE TWO PARTICIPATING HOSPITALS

3.1.1 Number and Sex Distribution of In-Patients

The results (in Table 3) show that there were 87 patients from the two hospitals who participated, 27(10 males and 17 females) from Cape Coast District Hospital (CCDH) and 60 (26 males and 34 females) from the Central Regional Hospital (CRH). In all, males constituted 41.1% whereas females formed 58.9% of the total participants.

TABLE 3.1: GENDER OF IN-PATIENTS RECEIVING PHARMACEUTICAL CARE AT THE PARTICIPATING HOSPITALS.

SEX	PARTICIPATING HOSPITALS		TOTAL	PERCENTAGE
	CCDH	CRH		
MALE	10	26	36	41.4%
FEMALE	17	34	51	58.6%
TOTAL	27	60	87	100%

A total of 87 patients were involved in the study.

3.1.2 Age Distribution

Table 3.2 indicates the number of patients and their percentage distribution in the various age groups among the in-patients who participated in the study. In both hospitals, majority of the patients were found in the productive age group of 18 years and above,

followed by the youngest and most vulnerable age group of less than 2years with percentages of 63.0 and 18.5 in CCDH and 67.8 and 11.7 in CRH respectively. Other age groups (2-6yrs, 13-18yrs and 7-12yrs) followed with percentages indicated in the Table.

TABLE 3.2 : AGE DISTRIBUTION (NUMBER AND PERCENTAGES) AMONG IN-PATIENTS RECEIVING PHARMACEUTICAL CARE IN THE PARTICIPATING HOSPITALS

	AGE	GROUP				
HOSPITAL	<2YRS	2-6YRS	7-12YRS	13-18YRS	>18YRS	TOTAL
CCDH	5(18.5%)	1(3.7%)	1(3.7%)	3(11.1)	17(63.0)	27(100%)
CRH	7(11.7)	6(10.0%)	2(3.3%)	3(5.0%)	42(70.0%)	60(100%)
TOTAL	12(13.8%)	7(8.0%)	3(3.5%)	6(6.9%)	59(67.8%)	87(100%)

3.2 PRESCRIPTION FACTORS IDENTIFIED

Table 3.3 indicates the different types and proportions of identified prescription factors which may affect pharmaceutical care and its related issues existing among the patients.

TABLE 3.3 PRESCRIPTION FACTORS**EXISTING AMONG IN- PATIENTS IN THE HOSPITALS**

PRESCRIPTION FACTORS	PARTICIPATING HOSPITALS	
	CCDH	CRH
TOTAL NO. OF DRUGS USED BY PATIENTS	150	399
AVERAGE NO. OF DRUGS PER PATIENT	6	7
NO. OF PATIENTS ON INJECTABLES	22	52
PERCENTAGE OF PATIENTS ON INJECTABLE	81.5%	86.7%
NO. OF PRESCRIBED DRUGS WITH NO STRENGTH INDICATION	70	136
PERCENTAGE OF PRESCRIBED DRUGS WITH NO STRENGTH INDICATION	47%	34%
PERCENTAGE OF CASES WITH WRITTEN DIAGNOSIS	100%	100%
PERCENTAGE OF DRUG AVAILABILITY IN HEALTH FACILITY	69.3%	93.7%
PERCENTAGE OF DRUGS PRESCRIBED IN GENERICS	70%	56.1%

3.3 COMMON CLASS OF MEDICINES USED BY THE IN- PATIENTS IN THE HOSPITALS

Figure 3.1 and Table 3.4 indicate the common class of prescribed drugs being used by the in-patients in the two participating hospitals, the CCDH and the CRH respectively. Common class of prescribed drug is defined here as any class of drug prescribed two times or more. The results here also indicate the number and proportion of non-prescribed medicines used by the patients which obviously can have effect on pharmaceutical care and can be a source of pharmaceutical care issue especially when the patients are using them without the knowledge of the health care professionals.

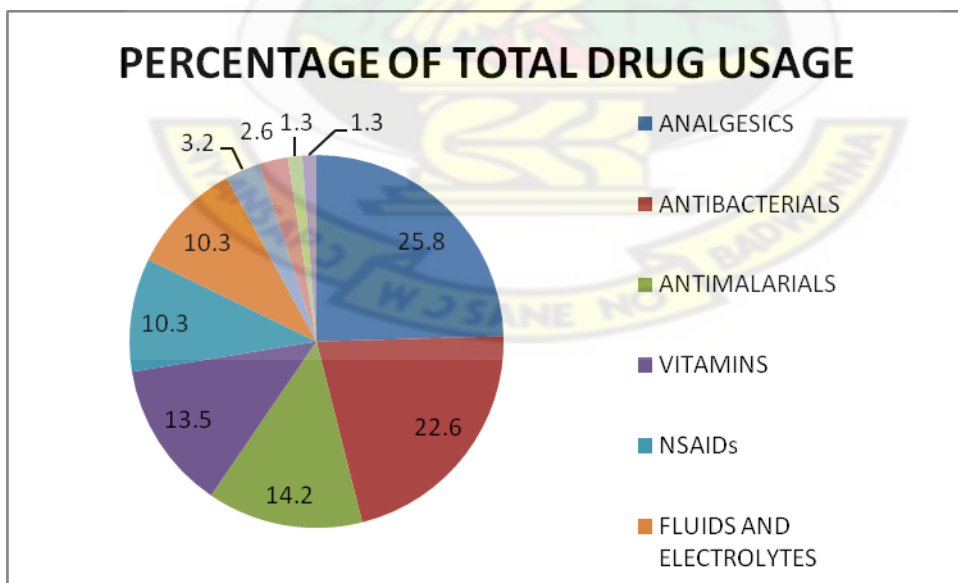


FIGURE 3.1: A PIE CHART INDICATING THE PROPORTIONS OF COMMONLY PRESCRIBED CLASS OF DRUGS IN THE CAPE COAST DISTRICT HOSPITAL

TABLE 3.4 : Common classes of medicines being taken by 60 In-Patients at the Central Regional Hospital

Drug class(BNF Category)	No. of medicines	Percentage
Prescription drugs		
Antibacterials	140	34.8
Fluids and Electrolytes	57	14.2
NSAIDs	35	8.7
Analgesics	33	8.2
Antimalarials	32	8.0
Vitamins	29	7.2
Diuretics (2.2)	16	4.0
Drugs used in diabetes (6.1)	9	2.2
Nitrates, Calcium channel blockers and Potassium-channel activators.	9	2.2
Antihistamines	7	1.7
Drugs used in bleeding (2.9)	7	1.7
ACE Inhibitors and other antihypertensives.	5	1.2
Hypnotics and Anxiolytics (4.1)	4	1.0
Corticosteroids (6.3)	4	1.0
Non-Prescription medicines		
Vitamins (9.6)	1	0.2
Analgesics (4.7)	1	0.2

3.4 PHARMACEUTICAL RISK FACTORS AMONG IN-PATIENTS RECEIVING PHARMACEUTICAL CARE IN THE HOSPITAL

Pharmaceutical risk factors identified

Table 3.5 indicates different types and proportions of pharmaceutical risk factors identified among the participating patients in the two hospitals. Whereas seven types of risk factors were identified eighty-two times in different proportions in the 27 in-patients in the Cape Coast District Hospital, ten different types of risk factors were identified 167 times in different proportions in the 60 in-patients in the Central Regional Hospital.

These factors may, by one way or the other have had influence on pharmaceutical care and its related issues as discussed below.

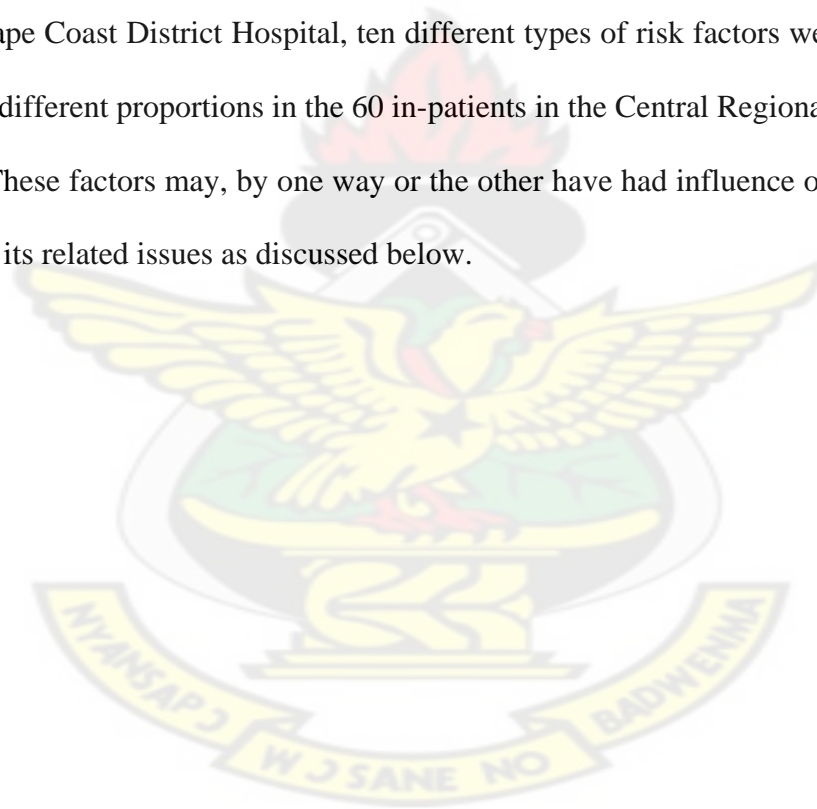


Table 3.5: Pharmaceutical risk factors in 27 in-patients and 60 in-patients receiving pharmaceutical care at the Cape Coast District Hospital and Central Regional Hospital Respectively

Risk factors	Cape Coast District Hospital		Central Regional Hospital	
	No. of Patients	(%age)	No. of Patients	(%age)
Non-Oral route of administration	25	30.5	53	31.7
Need help with medicine	20	24.4	25	15.0
Drug with narrow therapeutic index	12	14.6	25	15.0
Reduced Compliance	10	12.2	27	16.1
Renal Impairment	5	6.1	4	2.4
Swallowing difficulty	5	6.1	16	9.6
Physical impairment			2	1.2
Abnormal liver function			3	1.8
Cardiac failure			2	1.2
Others	5	6.1	10	6.0
TOTAL	82	100.0	167	100.0

3.5 PHARMACEUTICAL CARE ISSUES AMONG IN-PATIENTS RECEIVING PHARMACEUTICAL CARE IN THE HOSPITAL

Pharmaceutical Care Issues (PCIs) Identified

Table 3.6 indicates different types and proportions of pharmaceutical care issues identified among the participating patients in the two hospitals. Seven types of pharmaceutical care issues were identified 143 times in different proportions in the 27 in-

patients in the Cape Coast District Hospital whiles twelve different types of pharmaceutical care issues were identified 530 times in different proportions in the 60 in-patients in the Central Regional Hospital.

Table 3.6 : Pharmaceutical Care Issues (PCIs) in 27 and 60 In-Patients receiving pharmaceutical care at the Cape Coast District Hospital and Central Regional Hospital Respectively

Risk factors	Cape Coast District Hospital		Central Regional Hospital	
	No. of Patients	(%age)	No. of Patients	(%age)
Potential/Suspected adverse drug reaction	48	33.6	145	27.3
Education and Counseling required	33	23.0	92	17.4
Monitoring Issues	21	14.7	48	9.0
Cost issues	12	8.4	89	16.8
Potential/Actual Compliance	12	8.4	25	4.7
Potential ineffective therapy	10	7.0	9	1.7
Drug use with no indication	7	4.9	28	5.3
Inappropriate dosage regimen			36	6.8
Inappropriate duration of therapy			35	6.6
Duplication of therapy			12	2.3
Untreated indication for therapy			10	1.9
Potential drug-drug interaction			1	0.2
	143	100	530	100

3.6 OVERVIEW OF CONDITIONS (CASES) AND TREATMENT AVAILABLE

NB: Total PCIs Identified in the CCDH and CRH are 143 and 530 respectively (Ref. Table 8)

Table 3.7 depicts the number and proportions of pharmaceutical care issues identified as a result of wrong treatment for the conditions or cases. The types of PCIs identified here were mainly; Potential/Suspected adverse drug reactions, Cost issues, Monitoring issues, Drug use with no indication, Potential ineffective therapy and Potential/Actual compliance.

TABLE 3.7 : Overview of conditions (cases) and treatment available in the two hospitals.

Hospital	No. of conditions (cases)	No. of cases given correct treatment	No. of cases given wrong treatment	No. of PCIs resulting from wrong treatment	Percentage of total PCIs identified
CCDH	27	20	7	17	11.9
CRH	60	46	14	45	8.7
TOTAL	87	66	21	62	9.2

3.7 RECOMMENDATIONS (PHARMACEUTICAL ACTION PLAN) MADE TO RESOLVE THE IDENTIFIED PCIs

Tables 3.8 and 3.9 indicate the various recommendations made to both health care professionals and patients or carers in order to resolve the identified pharmaceutical care issues in the two hospitals. Eight types of recommendations were made to both health care professionals and patients or carers in the two hospitals. However, whereas a total of 355 recommendations (177 to health care professional and 178 to patient or carer) were made to resolve the PCIs identified in the CCDH, 1130 recommendations (604 to health care professional and 526 to patient or carer) were made to resolve the PCIs identified in the Central Regional Hospital.



3.7.1 Recommendations to resolve pharmaceutical care issues identified among in-patients receiving care at the hospital

TABLE 3.8 : Recommendations (Care plan) made to resolve Pharmaceutical Care Issues (PCIs) identified in 27 In-Patients receiving pharmaceutical care at the Cape Coast District Hospital

Type of advice to be given	No. of times	% of total PCIs
Advice to Health Care Professionals		
Carry out monitoring	69	48.2
Change record	7	4.9
Change a dose	9	6.3
Change a drug	25	17.5
Stop a drug	15	10.5
Add a drug	22	15.4
Provide compliance aid	10	7.0
Other advice	20	14.0
Advice to Patient or Carer		
Drug information to be provided	93	65.0
Change dose	9	6.3
Change time of administration	2	1.4
Change method of administration	4	2.8
Consult GP(Prescriber)	35	24.5
Stop non-prescription drugs	2	1.4
Life style change advice	6	4.2
Other advice	27	18.9
TOTAL	355	100

TABLE 3.9 : Recommendations (Care plan) made to resolve Pharmaceutical Care Issues (PCIs) identified in 60 In-Patients receiving pharmaceutical care at the Central Regional Hospital

Type of advice to be given	No. of times	% of total PCIs
Advice to Health Care Professionals		
Carry out monitoring	218	41.1
Change record	74	14.0
Change a dose	48	9.1
Change a drug	65	12.3
Stop a drug	43	8.1
Add a drug	67	12.6
Provide compliance aid	34	6.4
Other advice	55	10.4
Advice to Patient or Carer		
Drug information to be provided	307	57.9
Change dose	22	4.2
Change time of administration	5	0.9
Change method of administration	9	1.7
Consult GP(Prescriber)	62	11.7
Stop non-prescription drugs	15	2.8
Life style change advice	36	6.8
Other advice	70	13.2
TOTAL	1130	

3.8 OVERVIEW OF INDIVIDUAL DISEASES (CONDITIONS) AND CAUSES OF ADMISSION

Figure 3.2 and Table 3.10 give an overview of all the various conditions and causes of admission in the CCDH and the CRH respectively.

Figure 2 also shows diagrammatical representations of the proportions or percentages of the common conditions and causes of admissions in the CCDH.

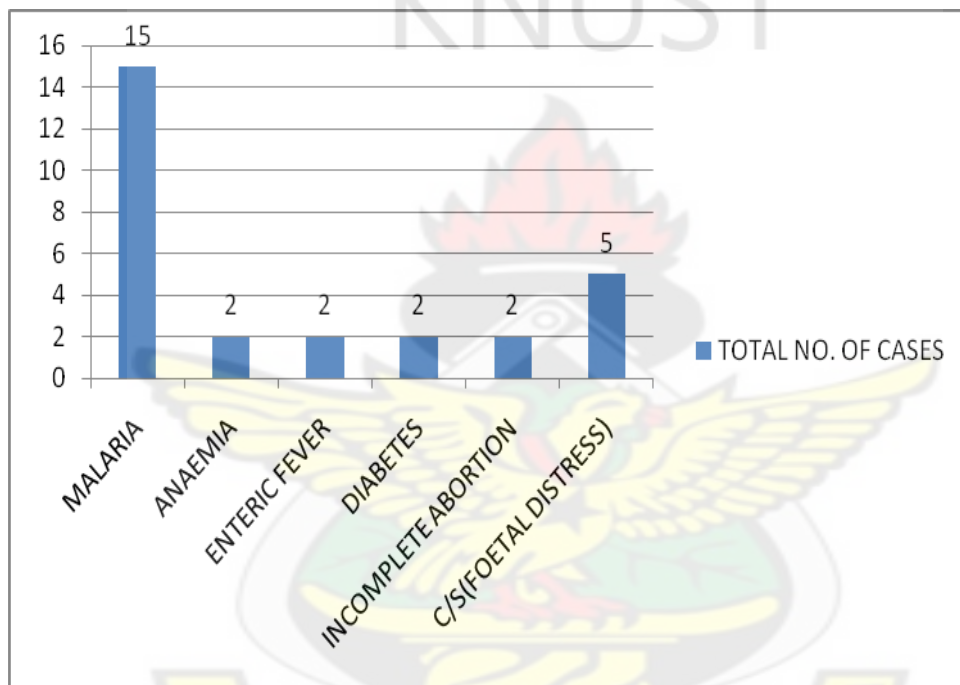


FIGURE 3.2: COMMON CONDITIONS AND CAUSES OF ADMISSIONS AMONG IN-PATIENTS IN THE CAPE COAST DISTRICT HOSPITAL

**TABLE 3.10 : COMMON CONDITIONS AND CAUSES OF ADMISSIONS
(INDIVIDUAL DISEASES) AMONG IN-PATIENTS IN THE CRH**

<u>CONDITIONS/CASES</u>	<u>NO. OF CASES</u>	<u>PERCENTAGE OF TOTAL NO. OF CASES</u>
MALARIA	16	16.3
ANAEMIA	8	8.2
ENTERIC FEVER	6	6.1
CELLULITIS	5	5.1
GANGRENE	5	5.1
DIABETES	5	5.1
HYPERTENTION	3	3.1
BURNS	3	3.1
PIH	3	3.1
CVA	2	2
LIVER CIRRHOSIS	2	2
SPLENOMEGALY	2	2
ASCITIS	2	2
OEDEMA	2	2
OTITIS MEDIA	2	2
FIBROID/ENDOMETRIAL		
CANCER	2	2

CHAPTER FOUR

DISCUSSION & CONCLUSION

DISCUSSION 4.1

4.1.1 NUMBER AND TYPE OF PATIENTS INVOLVED IN THE STUDY

The results show that there were 87 in- patients from the two hospitals who participated (Table 3.1) in the study, 27 from Cape Coast District Hospital (CCDH) and 60 from the Central Regional Hospital (CRH). Male patients constituted 41.1% whereas females formed 58.9% of the total participants.

In both hospitals, majority of the patients were found in the productive age group of 18 years and above, followed by the youngest and most vulnerable age group of less than 2years (Table 3.2). This is very significant in this research so far as pharmaceutical care and its related issues are concerned in that, even though every patient is important and must be given the best pharmaceutical care, the productive age group of 18years and above forms the majority of the workforce of the nation, and the most vulnerable age group of less than 2years also represent the future of this nation. By implication, this study reveals to stakeholders in health in particular, and to all of us as Ghanaians that the growth and the future of our dear nation depend to some extent on proper pharmaceutical care and management of its associated issues. As productive age group patients, they would need efficient pharmaceutical care to enable them go back to work for productivity to move the nation forward hence the need for government and other stakeholders to consider pharmaceutical care as a priority in the nation's development.

4.1.2 MEDICINES PRESCRIBED FOR PATIENTS

The 27 in-patients receiving pharmaceutical care at the CCDH were using 150 drugs (rTable 3.3 and Figure 3.1) with average of 6 drugs per patient. The results also show that most (22 or 81.5%) of the in-patients were given injectable drug of one form or the other. This may not be so surprising since most patients admitted in hospitals may be severely ill and may in addition not be in the best position to take oral medication especially during the early stages of their therapy. It could also be deduced from Table 3.3 that, 70 or 47% of the prescribed drugs being used by the in-patients at the CCDH were not prescribed in strength but rather in the number of tablets and volume of liquid formulations.

In the Central Regional Hospital .the sixty (60) in-patients receiving pharmaceutical care were taking 399 drugs with an average of 7 drugs per patient (Table 3.3). In this hospital, 52 patients representing 86.7% were put on injectables including infusions. Both the average number of drugs per patient and percentage of injectable use at the CRH are higher than those of the CCDH. This may be explained by the fact that the CRH is a referral hospital and therefore may be admitting very bad cases which may require administering many drugs including infusions and other forms of injectables. This argument may be supported by the large number of drugs and injectables which were being received by the two (2) patients at the Intensive Care Unit of the CRH. The two patients were on thirty-three (33) drugs which are all injectables except one which is a suppository . The results from Table 3.3 also indicates that 136 out of 399 or 34% of prescribed drugs used by in-patients in the CRH have their strength to be administered

written as the number of tablets or volume of liquid formulation. One may be tempted to describe the patients as being on multiple drug therapy considering the average numbers of drugs per patients. However, it is likely the patients may not be discharged on all these medicines. Probably, further research work need to be done in relation to Rational Drug Use (RDU) and pharmaceutical care issues to ascertain this. If this is established conclusively, then we can say that this use of multiple drugs, many injectables and prescribed medicines without their specific strengths (even though they were of different strengths) may have effect on pharmaceutical care by way of contributing to some pharmaceutical risk factors (including; Drug with narrow therapeutic index, Renal impairment and Reduced compliance) which may also increase the incidence of pharmaceutical care issues (such as Inappropriate dosage regimen, Potential/Suspected adverse drug reactions, Potential/Actual compliance and Cost issues) among the patients.

The results also show that both hospitals recorded 100% cases with written diagnosis which is very encouraging in the sense that written diagnosis would enhance better clinical and pharmaceutical care (especially for future care) of the patient. Proper diagnosis and its documentation may also reduce the incidence of pharmaceutical care issues among patients.

Percentage drug availability in health facility as captured in the result (Table3.3) for CCDH and CRH were 69.3% and 93.7% respectively. This is an indication that pharmaceutical care issues that may result from non-availability of drugs (eg. Cost issues) in the health facility may be more pronounced in the CCDH since availability of drugs is crucial for effective pharmaceutical care with minimal incidence of care issues

that may result from drug non-availability. For effective pharmaceutical care, the hospitals must be encouraged to have 100% essential drug availability.

For generic drug prescription, the results (Table 3.3) show that the CCDH had 70% with CRH recording 56.1%. These results are lower (especially that of CRH) than the recommended 100% generic prescription by MOH and the GHS for public health institutions. These lower figures for generic prescription can result in cost issues in pharmaceutical care since non-generic drugs are generally expensive.

4.1.3 MOST COMMON CLASS OF MEDICINES USED BY PATIENTS

The common classes of drugs being taken by the in-patients and the proportions they form are indicated in Tables 3.4 and 3.5. Whereas analgesics were the commonest (25.8%) drug being used by the in-patients at the CCDH, antimicrobials were the commonest (34.8%) drugs used by in-patients at the CRH. Even though the proportion or rate of use of non-prescription medicines by the in-patients was significantly low, it must not be encouraged since it may affect proper pharmaceutical care. It was established from patient interview that, most (about 85%) of these drugs were being used without the knowledge of the health care staff. Non prescription drugs were mainly analgesics, antacids and vitamins. Other common classes of prescribed medicines being used by the patients apart from analgesics and antimicrobials in the two hospitals include; anti malaria, fluids and electrolytes, non-steroidal anti-inflammatory drugs, vitamins, diuretics etc. It was noticed that even though malaria was the leading cause of admission in the two hospitals (Table 3.10), anti malaria were not the most commonly prescribed drugs (Tables 3.4 & 3.5). This finding in addition to the fact that the average number of drugs

per patient in the two hospitals is more than 6 would require further studies in rational drug use (RDU) to assign reasons to them.

4.1.4 PHARMACEUTICAL RISK FACTORS

The identified pharmaceutical risk factors among in-patients receiving pharmaceutical care at the CCDH and the CRH are represented in Table 3.6. The results show that, 82 and 167 pharmaceutical risk factors were identified among the in-patient at the CCDH and the CRH respectively. The identification of these factors are very relevant to this study as indicated earlier in the literature review/introduction that, patients could be assessed for pharmaceutical care issues by taking full account of their medication factors that may predispose them to the risk of treatment failures or adverse effects(i.e. pharmaceutical risk factors). Both hospitals had Non-oral route of administration as their highest number of pharmaceutical risk factor with 30.5% and 31.7% of total pharmaceutical risk factors identified among patients in CCDH and CRH respectively. This supports the high injectable use. Other pharmaceutical risk factors identified with the patients are as indicated in the tables. They include; Reduced compliance ,Need help with medicine, Drug with narrow therapeutic index, Swallowing difficulty, Renal impairment, Abnormal liver function, Physical impairment etc with their percentages or incidence of occurrence as shown in Table 3.7. These have been identified in some previous studies (Crag, 1999). The “others” in the tables represented those pharmaceutical risk factors which were identified only once.

The identification of pharmaceutical risk factors are very significant in pharmaceutical care since they can help in the identification of pharmaceutical care issues which could be addressed by the pharmacist.

Information obtained by questioning the patients showed that all the 87 patients involved in the study had regular help with their medicines in the form of drug collection and/or administration. Most patients (83 cases, 95 %) needed help in taking their medicines correctly. Even 2 out of the 4 cases (4.6 %) who claim they did not need help in this direction confessed to have been reminded sometimes to take their medicines at the right time. This assistance was totally provided by health care staff or professional particularly nurses, doctors and other health workers in the wards. In the area of drug collection, almost all (86 cases, 99 %) patients required help in collecting their medicines. This assistance was also provided mostly (72 cases, 83 %) by health care professionals and members of the patient's family (15 cases, 17 %) including friends and neighbours.

4.1.5 PHARMACEUTICAL CARE ISSUES IDENTIFIED

The results (Table 3.7) show that, 143 and 530 PCIs were identified among the in-patients at the CCDH and the CRH respectively. Both hospitals had Potential/Actual adverse drug reactions as the top most PCI with 33.6 % and 27.3% of total PCIs identified among the in-patient at the CCDH and the CRH respectively. Education required followed as the next leading PCI in both health institutions, with the others following in the order of different proportions or percentages as shown in the Table 3.7.

They include; Education required Monitoring issues, Cost issues, Potential/Actual compliance, Potential ineffective therapy, Drug use with no indication, Untreated indication for therapy etc. In the introduction/literature review, mention was made to the fact that there was not known document on pharmaceutical care issues existing among patients in the region. The identification of these issues in this study is an indication that pharmaceutical care issues really exist among in-patients receiving treatment in the region. This result could indeed be documented and published to form the basic evidence of the existence of pharmaceutical care issues among patients in the region,

- The high level of prescriber (or General Practitioner) agreement with the Pharmaceutical Care Issues (PCIs) identified is an indication of their validity. The types of PCI encountered in these patients have been found in previous studies, both those involving the elderly (Krska *et al*, 2000) and those covering a wider population as in the case of this work (Fairbrother *et al*, 1993).
- The need for monitoring was a major PCI, particularly for quinine, diuretics, insulin, digoxin and angiotensin converting enzyme (ACE) inhibitors. The lack of adequate monitoring for these drug classes (especially diuretics and ACE inhibitors) has been highlighted in previous studies (Kalra *et al*, 1998). These two drug classes were also implicated in some of the PCIs classed as potentially ineffective therapy, and diuretics also featured somehow in the category of drug use with no indication. Many people (especially the elderly) are treated with diuretics for gravitational oedema and/or breathlessness from various causes. These drugs have been identified as being a frequent contributory factor to hospital admissions. (Rhodes, 1992). Because of this and many

other reasons, this study highlighted the importance of reviewing elderly patients' treatment with diuretics. Pharmaceutical Care Issues (PCIs) were found in all patients. Overall, the percentage of issues with which Prescribers (Doctors) agreed was high as well as the percentage of recommendations that was accepted by them.

- The majority of the PCIs (356; 52.9 %) were identified from the prescription, others from medical records (111; 16.5%) and from patient interview (206; 30.6 %). The frequencies of different types of PCIs identified are also shown in the Table.
- Strong positive relationships were found between the number of medicines taken and the presence of care issues relating to potentially ineffective therapy and no indication for medicine use (that is to say higher number of drugs were found to be used by patients in whom these PCIs existed). Suspected adverse drug reactions were also more likely to be present in patients with both high numbers of medicines and pharmaceutical risk factors. Increasing risk factors also increased the likelihood of care issues relating to potentially ineffective therapy, compliance, and the need for education.

Some PCIs (58, or 8.6% of total PCIs) involved no specific drugs. Most of the remainder involved one drug (401, 59.6 %) or two to four drugs (199, 29.6 %). Issues involving more than four drugs accounted for 15 issues (2.2 %), most of which concerned the need for education or suspected/actual compliance issues.

4.1.6 RECOMMENDATIONS MADE TO RESOLVE THE PHARMACEUTICAL CARE ISSUES IDENTIFIED

Tables 3.8 and 3.9 show the recommendations or pharmaceutical care plans formulated to be implemented to resolve the identified pharmaceutical care issues with the number of times they need to be carried out. The recommendations include advice to health care professionals and advice to patient or carer when necessary. These recommendations were indeed agreed by the prescribers (general practitioners or GPs) after discussing with them.

The results show that a total of 1485 recommendations, made up of 355 and 1130 at the CCDH and the CRH respectively were made to resolve the respective 143 and 530 PCIs identified. Actions recommended to be taken including advice to health professionals and patient or carer include; Patient and therapy monitoring, providing drug information, change of patient records, changing a drug or drug dosage, stopping a drug etc. as indicated in Tables 3.8 and 3.9 for CCDH and CRH respectively. Implementing these recommendations through proper pharmaceutical care practice or service by the pharmacist with the help of the other health care professionals and cooperation from the patients would be expected to resolve most if not all the pharmaceutical care issues identified.

These recommendations differed depending on the drugs involved and the type of PCI; for example, monitoring was recommended for 6 quinine injections in CCDH and 14 diuretics, 15 quinine, 5 insulin injections, 1 digoxin and 1 angiotensin-converting enzyme inhibitor in the CRH to resolve the issue of a potential adverse drug reaction. Changing medicines was recommended for different kinds of PCI, particularly for potentially ineffective therapy (10 in CCDH and 9 in CRH), potential adverse reactions (48 in CCDH and 145 in CRH). In most of the cases when the recommendation was to stop

a drug, it was related to use of drug with no indication including non-prescribed drugs (7 in CCDH and 28 in CRH), inappropriate duration of therapy (10 in CRH) and duplication of therapy (12 in CRH). Analgesics were the drugs most commonly recommended for discontinuation. Adding drugs was recommended for 12 (7 and 5 in CCDH and CRH respectively) cases of potentially ineffective therapy and 10 cases of untreated indications (in CRH only). Advice to patients on dose (9 in CCDH and 22 in CRH), timing (2 in CCDH and 5 in CRH) and administration (4 in CCDH and 9 in CRH) was recommended to resolve issues relating to the need for education, many of which concerned analgesics (56 in CCDH and 78 in CRH) and antibiotics (35 in CCDH and 140 in CRH). A total of 1485 (355 and 1130 for CCDH and CRH respectively) recommendations requiring action were made on care plans to resolve the care issues.

4.1.7 IMPLEMENTATION AND MONITORING OF PHARMACEUTICAL CARE PLANS

Even though for the purpose of this work follow up of Patients was not done, 1485 separate actions were taken by pharmacists to implement the recommendations required to resolve the 673 PCIs after obtaining agreement from Prescribers(GPs) and patients. Some PCIs required action which involved only patients (189 PCIs; 28.1 %), such as the provision of advice. Most issues (397; 60%) required communication with a health care professional and 87 (11.9 %) involved communication with both. The need for contact with health care professionals differed for different types of PCI. The most frequent reason for such contact involved the requirement to undertake monitoring for

potential adverse reactions (48 and 145 for CCDH and CRH respectively) and the need to discuss potentially ineffective therapy (10 and 9 for CCDH and CRH respectively). A significant number of PCIs (77) did not require contact with a Prescriber (or GP), since arrangements for monitoring or changes to prescription records were done through other practice staff including nurses, record staff etc. However, the majority of patients, 77 (24 and 53 from CCDH and CRH respectively) forming 88.5 per cent had at least one PCI which required contact with a Prescriber.

Antimicrobials and analgesics were the most common drugs associated with a need for education, which is another area where the majority of PCIs were to be resolved by the pharmacist. Many issues relating to compliance, untreated indication and potentially ineffective therapy were also to be resolved by pharmacist intervention. The resolution of the PCIs would therefore have the potential to prevent serious consequences.

The resolution of issues involving differences between doses prescribed and used, and medicines no longer required would also be expected (in case they come up as new PCIs to be dealt with in the course of implementing and monitoring the pharmaceutical care plan), and would confirm previous work showing that most of these problems are easily resolved by pharmacists. (Read & Krska , 1998)

- Although almost all patients had PCIs requiring discussion with a Prescriber (or GP), a substantial number of PCIs (about 30%) were to be resolved without such contact. Thus, delegation of authority to pharmacists for requesting monitoring and changing patient records would further reduce the workload created by the delivery of pharmaceutical care. Further delegation to the pharmacist for implementing actions could

also increase the number of PCIs that could be resolved, since some research has indicated that certain agreed actions were not subsequently implemented by Prescribers (or GPs) ,(Royal Pharmaceutical Society of Great Britain.,1997). probably because of work overload.

- The results also confirm previous work which found that most issues were identifiable from prescription records (Fairbrother *et al* .,1993), and patient interview. This shows therefore, that many issues could be identified from community pharmacies by recourse to patient medication records (PMRs) and the patients. While there is a large number of PCIs identifiable by this means, access to medical records is necessary to identify and make recommendations to resolve PCIs.
- It must be noted that much other work has focused on review of prescription data only, with no patient interview. (Hawksworth,*et al* . ,1999) This is clearly a valuable means of identifying and resolving problems. However, the patient is a vital component in the medication review process. This study has demonstrated that further PCIs were identified from patient interview and that patient agreement with proposed actions was not always obtained. Given the accepted importance of patient involvement in therapy decisions,(Furniss *et al* ,1998) ,the inclusion of a patient interview in any medication review process, as described in the guidelines,(Sodha *et al* ,1999) is recommended. In the present study this was carried out in the medical practice (or health facility), but similar interviews could be undertaken in the patient's home or the community pharmacy, given appropriate facilities and access to information from medical records

It must also be noted that, some patients had multiple issues requiring prolonged implementation plans, and would again require very long periods of time before follow-

up could be made to obtain possible resolution of PCIs. The time taken to provide this pharmaceutical care service was not measured in the present study, but would be important in planning similar services.

4,2 CONCLUSION

From the results of the study, the following conclusions are drawn:

- In-patients are generally on large number of drugs, with average of more than 6 drugs per patient.
- Majority of in-patients (74 or 85%) are on injectable drugs of one form or the other.
- Many pharmaceutical risk factors (249 factors in 87 patients) exist among in-patients receiving pharmaceutical care in the hospital.
- The use of large number of drugs including many injectables by the in-patients, coupled with the existence of many pharmaceutical risk factors contribute to the existence of many pharmaceutical care issues (673 PCIs with average of 7.7 per patient) among the patients.
- Identification of pharmaceutical care issues is possible through patient interview, and review of prescription and medication records.
- The most common PCI existing among in-patients receiving pharmaceutical care in the hospital is potential/actual adverse drug reactions (193, forming 28.7% of total PCIs among the in-patients)
- 1485 separate actions were required to be implemented to resolve all the 673 PCIs among the in-patients in the two hospitals.
- This (implementation of pharmaceutical care plan) was indeed feasible because they were all implemented by the pharmacists in the hospitals, even though follow ups were not made to determine the extent of PCI resolution for the purpose of this study.

- The incidence of some pharmaceutical care issues such as suspected adverse drug reactions and no indication for medicine use have some correlation (proportional to) with the number of medicine use.
- It is feasible for the pharmacist to provide pharmaceutical care, identify pharmaceutical care issues and implement pharmaceutical care plan or actions to resolve those issues in a general practice setting like the CCDH and the CRH.

4.2.1 RECOMMENDATIONS

The following recommendations are made for consideration, based on the findings of this study.

1. In this study it was found out that only three pharmacists (one clinical pharmacy student and two practice non-clinical pharmacists) were to implement all the numerous pharmaceutical care plans or actions in the two hospitals. Considering the existence of many pharmaceutical care issues among the patients and the need to resolve these issues promptly and efficiently, the researcher recommends the need for the stakeholders in health including MOH and the GHS to employ and train more Clinical Pharmacists to practice pharmaceutical care skillfully.
2. Polypharmacy may be practiced in the prescribing of drugs with many other concerns about rational drug use. This could contribute to the existence of many pharmaceutical care issues among in-patients. The researcher therefore recommends intensive education and training of prescribers in rational drug use.
3. The study revealed that the majority of the in-patients suffering from the effects of diseases (morbidity) were in the productive age group and need to recover well and early through prudent medical (including pharmaceutical) care in order to

return to work to enhance productivity and hence the nations development, since the development of a nation depends on the health of its productive citizens. The researcher in this study therefore recommends that pharmaceutical care and its associated issues must be considered a priority area in health delivery by stakeholders including the government if the nation is to develop as expected.

4. The study identified potential/actual adverse drug reactions as the most common PCI among in-patients receiving pharmaceutical care in the hospitals. To this, the researcher recommend that vigorous pharmacovigilance programmes involving monitoring, recording and reporting of adverse drug reactions for effective management be encouraged in all health facilities. The Ghana National Drug Programme (GNDP) could be of help in that direction.
5. The study again indicated that, it is feasible for the pharmacist to provide pharmaceutical care, identify pharmaceutical care issues and implement pharmaceutical care plan or actions (to resolve care issues) in a general practice setting. The researcher recommends that more of such studies be carried out in many different types of health facilities including polyclinics, private hospitals, mission hospitals, specialist hospitals etc. to give a broader and better picture of what pertains in our health facilities in general so far as pharmaceutical care and issues are concerned.
6. It is also recommended that similar studies be carried out among out-patients receiving pharmaceutical care in the health facilities, for the purpose of comparing the different types of care issues that exist among out-patients and in-

patients in order to assist health managers to some extent in the area of prioritizing resources (both human and material).

7. Finally, the research identified that, some patients have multiple pharmaceutical care issues that require prolonged implementation plans or actions, and therefore may require long periods of time before follow-up could be made to obtain possible resolution of PCIs. With most patients having shorter length of stay in the hospitals than required for follow-up in pharmaceutical care plan implementation, most patients would have to be followed up in their houses. The researcher therefore recommends proper documentation of the identity of patients including identifiable addresses and location (example, correct house numbers and landmarks) for easy tracing and identification when necessary.
8. Ways of disseminating findings – This would be done by having a presentation of the result to the various institutions at their clinical presentation sections as well as publication in the news papers.
- 9.

4.2.2 EDUCATIONAL IMPORTANCE

The results and recommendations in this study have several implications for the future growth and development in the health sector. The study however reflected on the actual pharmaceutical care provided, and pharmaceutical care issues identified by pharmacists with the help of other health staff.

Implementation of recommendations would improve pharmaceutical care, increase pharmacist involvement in medical care, enhance pharmacist-patient relationship and ensure full realization of patient's benefit from health services.

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4.2.3 FURTHER RESEARCH AREAS

1. Further studies would be required to go beyond the implementation of pharmaceutical care plan, but to complete follow up of patients to evaluate resolution of pharmaceutical care issues.
2. It is suggested that the study be extended to out-patients and all category of patients in all other hospitals in Ghana.
3. This study should be repeated with time to indicate the trend of pharmaceutical care effectiveness in resolving pharmaceutical care issues among patients.

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APPENDIX 1

Checklist for patient information and other data collected from medication records

(i) Patient’s demographic characteristics

Patient’s Serial number.....

Name of patient.....

Age..... Sex.....

Patient’s identity number.....

Diagnosis.....

Patient’s Ward of admission.....

(ii) Patient’s chemotherapeutic information or data

Drug name frequency	Generic	Strength (Yes/No)	Formulation	Dose	Duration	Drug	Availability (Yes/No)
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APPENDIX 2

Patient/Carer interview (Questioner)

1. Please, what is your (patient) name or what is the name of the patient? (To carer if patient is a child or cannot speak)
2. How many drugs are you (patient) taking for now? / How many drugs are being given to your (child, relative etc.) patient now
3. Were all the drugs prescribed for you (or your patient) by the doctor in this hospital?Yes / No
4. If your answer to Question 3 is No, then which drug(s) are you (or is your patient) using outside the doctor’s prescription?

List them.

.....
.....
.....

5. Are you experiencing any unusual signs or symptoms (possible adverse drug reactions) since you started taking your medicines or drugs?Yes/No
6. If your answer to Question 5 is Yes, then indicate which signs or symptoms among the following (Symptoms Check List):

(Tick)

- Fever
- Headache

- Nausea
- Vomiting
- Diarrhoea
- Skin Itching
- Palpitation
- Abdominal pains
- Drowsiness
- Confusion
- Joint pains
- Anaemia
- Skin Rash
- Others, specify

7 Do you have any problems obtaining or using your medicines?.....Yes/No

8 If your answer to question 7 is yes, explain how.

.....

.....

.....

9 How did you obtain the drugs?

- By myself (patient)
- Through a health staff
- Through a relative
- Other, Specify

- 10 Do you (patient) minister the drugs by yourself?.....Yes/No
- 11 If your answer to Question 10 is No, then who assist you to take your medicine and which type of assistance is provided for you in drug administration

- Health Staff, reminding me to take medicine
- Relative, reminding me to take medicine
- Health Staff, administering the medicines especially the injectables

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APPENDIX 3

Interview questions and checklist for health care staff

These questions and check list were mainly to confirm the availability of drugs or otherwise, how patients obtained and had their medicines administered, as well as to clarify some prescriptions and hand writings in patients' medication records.

To Pharmacists:

1. Did you supply all the drugs of this patient in this hospital?.....Yes/No

2. If your answer in Question 1 is No, which of the drugs were not available for supply at the time?

List them

.....

.....

.....

(Reconcile with drugs analysis book if available).

From Ward Staff including prescribers, find out (Tick):

1. Who collects drugs for patient?
 - a. The Patient ()
 - b. Health Staff or ()
 - c. Patient Relative ()

2. Who administers the drugs?
 - a. The Patient ()
 - b. Health Staff or ()
 - c. Patient Relative ()

3. Clarifications for illegible, invalid and any questionable prescriptions.